

# Factors associated with breastfeeding in two municipalities with low human development index in Northeast Brazil

## *Fatores associados ao aleitamento materno em dois municípios com baixo índice de desenvolvimento humano no Nordeste do Brasil*

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Funding sources: *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq – National Council for Scientific and Technological Development), Public Notice MCT/MESA/CNPq/CT Agribusiness 01/2003, process number 502952/2003-2 and 502955/2003-1.

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### Abstract

**Objective:** To determine the duration of breastfeeding and to identify factors associated with exclusive / predominant breastfeeding in children under two years old. **Methods:** This is a cross-sectional study conducted from March to June 2005 in the municipalities of Gameleira and São João do Tigre, located in the interior of Pernambuco and Paraíba States. The sample comprised 504 children under two years (280 residents in Gameleira and 224 in São João do Tigre). Survival analysis was used to estimate the median duration of survival time of breastfeeding and the associations with socioeconomic conditions, factors related to mothers and children and health care. **Results:** The duration of exclusive and exclusive/predominant breastfeeding and breastfeeding were of 19, 79 and 179 days in Gameleira and 23, 91 and 169 days in São João do Tigre, respectively. Mothers with better socioeconomic conditions, as represented by education, sanitation, and possession of consumer goods, had a higher median duration of exclusive/ predominant breastfeeding in both towns. Prenatal care represented by higher number of attendance, earlier onset and feeding and breastfeeding advice had a positive influence on breastfeeding duration. **Conclusions:** Breastfeeding duration was lower than the recommendation. Despite the families precarious living conditions, a better socioeconomic status and prenatal care were protective factors for exclusive/ predominant breastfeeding duration in these areas.

**Keywords:** Breastfeeding. Early weaning. Associated factors. Low income. Infants.

## Resumo

**Objetivos:** Determinar a duração do aleitamento materno e verificar os fatores associados ao aleitamento exclusivo/predominante (AMEP), em crianças menores de dois anos de idade. **Métodos:** Estudo transversal realizado nos municípios de Gameleira, situado na Zona da Mata Sul do Estado de Pernambuco e em São João do Tigre, pertencente à Zona Semi-Árida do Estado da Paraíba, no período de março a junho de 2005. A amostra foi composta por 504 crianças menores de dois anos (280 residentes em Gameleira e 224 em São João do Tigre). Utilizou-se a análise de sobrevivência para estimar a mediana do aleitamento materno e das associações com a condição socioeconômica, com fatores relacionados às mães e crianças e assistência à saúde. **Resultados:** As durações medianas do tempo de sobrevivência do aleitamento materno exclusivo, exclusivo/predominante e aleitamento materno foram de 19, 79 e 179 dias em Gameleira e de 23, 91, e 169 dias em São João do Tigre, respectivamente. Mães com melhores condições socioeconômicas, representadas pela escolaridade, saneamento básico e posse de bens de consumo apresentaram maior duração do aleitamento exclusivo/predominante em ambos os municípios. Assistência pré-natal representada pelo maior número de consultas, início mais precoce e com orientação referente à alimentação e ao aleitamento materno influenciaram positivamente na duração do aleitamento exclusivo/predominante. **Conclusões:** A duração do aleitamento esteve aquém da recomendada. Apesar das precárias condições de vida das famílias, uma melhor condição socioeconômica e assistência ao pré-natal foram fatores protetores na duração do aleitamento exclusivo/predominante nessas áreas.

**Palavras-chave:** Aleitamento materno. Desmame precoce. Fatores associados. Baixa renda. Lactentes.

## Introduction

Exclusive breastfeeding in the first six months of life and the maintenance of breastfeeding complemented by other foods until the age of two years or more is considered to be the most appropriate diet for babies, as it efficiently contributes to health, and the most sensible, economic and effective intervention method to reduce child morbi-mortality<sup>1</sup>.

Although a natural process, maternal breastfeeding is influenced by several factors (biological, socioeconomic, cultural and demographic) that can interfere with its success. Studies conducted in several Brazilian states show that mothers who were less successful with breastfeeding were younger (aged less than 20 years), single and primiparous; had a lower level of education and socioeconomic condition; did not have positive previous breastfeeding experience; and needed to work out of home<sup>2-6</sup>.

In recent decades, there has been an increase in the frequency of maternal breastfeeding in Brazil, as evidenced in several studies such as the *Pesquisa Nacional de Demografia e Saúde da Criança e da Mulher* (PNDS – National Child and Women's Health and Demographic Survey). It was observed that the median duration of breastfeeding in children younger than 36 months of age rose from seven months in 1996 to nine months in 2006. When exclusive breastfeeding was taken into consideration, the duration was only two months in 2006, slightly higher than the PNDS value for 1996<sup>7,8</sup>. With regard to the Northeastern region of Brazil, there were no variations in maternal breastfeeding duration, which remained at approximately nine months, while exclusive breastfeeding values were similar to those observed in the country as a whole.

These findings indicate that, although there has been an increase in the prevalence of breastfeeding in recent years, early weaning remains an important public health problem in Brazil, especially in the Northeastern region. The semi-arid and coastal plain areas of this region are

considered to be priorities and, at the same time, one of the greatest challenges of the *Política Nacional de Segurança Alimentar e Nutricional* (PNSAN – National Food and Nutrition Safety Policy), due to the magnitude of the problems, poverty and exposed population<sup>9</sup>. In this sense, performing local diagnoses of breastfeeding situation is essential to support the intervention measures required to reduce early weaning and to minimize its consequences. Therefore, the present study aimed to verify the duration of breastfeeding and its determining factors in breastfeeding women living in urban and rural areas of two cities with a low human development index (HDI).

## Methods

The present study is part of a broader research project performed in the cities of Gameleira, situated in the Southern Coastal Plain in the state of Pernambuco, and São João do Tigre, in the Semi-Arid area of the state of Paraíba. These cities were purposefully selected due to their precarious living conditions, reflected in the low human development indices. This project aimed to compare the food and nutritional situation, health aspects and factors associated with their occurrence in groups of families living in the two areas previously mentioned. The cities of Gameleira and São João do Tigre have an HDI of 0.59 and 0.53, respectively, in a scale from 0 to 1<sup>10</sup>.

The present study had a cross-sectional design and the sample was calculated considering a prevalence of approximately 60% of food insecurity in the Northeastern region, according to PNAD results from 2004 (IBGE, 2006)<sup>11</sup> and estimating a maximum error of 5% and a significance level of 95%. Moreover, an additional 10% was added to compensate for possible losses or “no response” problems, resulting in a minimum sample of 440 families for each city. The *Statcalc* program of the Epi Info software, version 6.04, was used in the calculation.

In view of the epidemiological interest in children as a biological group which is

more vulnerable to nutritional problems, the presence of at least one child aged up to five years was established as an inclusion criterion. Thus, the total sample was comprised of 959 families (501 in Gameleira and 458 in São João do Tigre), distributed in urban and rural areas of both cities.

A sub-sample of children aged two years and younger was selected to investigate the factors associated with the duration of maternal breastfeeding in the present study, aiming to minimize maternal recall bias when giving information about the dietary pattern of children. Children who had been adopted were excluded from the study. Considering the criteria previously described, a sample comprised of 504 children was obtained (280 residents in Gameleira and 224 in São João do Tigre).

Data collection was performed in both cities, between March and June 2005, by a team of pre-selected and trained technicians. Data were collected through an interview with the parents/legal guardians of children during the home visits, using a pre-coded closed-ended questionnaire. The classification of breastfeeding was based on maternal recall information about the time during which children were breast-fed and at what age they began to receive water, tea, juice, artificial milk and solid foods.

The following explanatory variables were studied: socioeconomic conditions (food insecurity, per capita household income, maternal level of education, area of residence, number of people per room, water supply, basic sanitation, household goods); maternal data (age and body mass index – BMI); health care (prenatal care, number of consultations and starting month of prenatal care, guidance on maternal breastfeeding and child feeding, type of delivery); child data (sex, birth weight, hospitalization in the previous 12 months and visits from community health workers).

The definitions from the Pan-American Health Organization (PAHO) and World Health Organization (WHO) were adopted to categorize maternal breastfeeding types<sup>12</sup>. Exclusive breastfeeding consists

in receiving maternal milk exclusively, without the use of water, tea, juice or other liquids, except for drops of medications or vitamins or syrups containing vitamins, mineral supplements or medications, under medical recommendation; predominant breastfeeding consists in receiving maternal milk and other water-based liquids, such as teas, juices, water, infusions and oral rehydration salts; and maternal breastfeeding means to receive maternal milk, regardless of other types of food. The food insecurity assessment was performed with the application of the *Escala Brasileira de Insegurança Alimentar* (EBIA – Brazilian Food Insecurity Scale)<sup>13</sup>, adequately validated for the Brazilian context and comprised of 15 closed questions with positive or negative responses about participants' food situation experienced in the three months prior to the interview.

Double data entry was performed in the Epi-info software, version 6.04, to verify data consistency. Survival analysis was made with an actuarial table to estimate the median duration of maternal breastfeeding practices, considering at least one day of maternal breastfeeding for all children studied. Differences in monthly medians of breastfeeding practices resulting from the survival analysis were used for the graphic presentation of the dietary pattern. Children with exclusive and predominant breastfeeding were grouped into a category that was used as an outcome in the analyses of association with possible explanatory variables, described as medians of survival time of this maternal breastfeeding category.

The accumulated survival probability curves for exclusive/predominant breastfeeding among the different categories of each explanatory variable were assessed using the Wilcoxon test (Gehan), considering a  $p$ -value  $\leq 0.05$  as significant. These analyses were performed with the Statistical Package for the Social Sciences (SPSS), version 12.0.

The research projects were approved by the State of Pernambuco Maternal and

Child Institute Research Ethics Committee, meeting the regulatory human research norms – Resolution 196/96 of the National Health Council, under registration number 386. Participants who accepted to take part in the study were previously informed about the research objectives and data confidentiality and parents/legal guardians of children signed an informed consent form.

## Results

Table 1 shows that families in both cities have high percentages of food insecurity (90%), with a predominance of severe insecurity conditions (38.6%) in Gameleira and average conditions (36.6%) in São João do Tigre. There was a high percentage of mothers who had not completed eight years of education and who mainly lived below the poverty line, with a per capita household income lower than half a minimum wage per month, reflecting their poor housing and basic sanitation conditions.

Table 2 shows that the majority of mothers were young adults, nearly half of them had an adequate BMI in both cities, and 70% had begun prenatal care in the first gestational trimester; however, in Gameleira, almost half of the mothers had at least six consultations. With regard to children, the majority had an adequate birth weight and received a visit from community health workers in both cities.

When different breastfeeding practices are compared (Figures 1 and 2), a similar behavior is observed in both cities, with a decrease in the initial segments of the curves, showing high weaning rates on the first days of life, which is higher for exclusive breastfeeding. The median survival time of exclusive breastfeeding was very low in both cities: 19 days in Gameleira and 23 days in São João do Tigre. When exclusive/predominant breastfeeding were considered, this value rose to 79 and 91 days, respectively. With regard to maternal breastfeeding, median survival time was 179 days in Gameleira and 169 days in São João do Tigre.

In terms of the factors associated with

**Table 1** - Median duration of survival time of exclusive /predominant breastfeeding in children under two years according to socioeconomic factors in Gameleira (PE) and São João do Tigre (PB), 2005.

**Tabela 1** - Duração mediana do tempo de sobrevivência do aleitamento materno exclusivo/predominante em menores de dois anos segundo os fatores socioeconômicos em Gameleira (PE) e São João do Tigre (PB), 2005.

Variables	Gameleira (N = 280)				São João do Tigre (N = 224)			
	n	(%)	Median (days)	P	N	(%)	Median (days)	P
<b>Food security</b>								
Food security	37	(13.2)	66.3		22	(9.8)	141.4	
Mild food insecurity	46	(16.4)	69.8		69	(30.8)	69.3	
Average food insecurity	89	(31.8)	88.3		82	(36.6)	94.6	
Severe food insecurity	108	(38.6)	85.6	0.25	51	(22.8)	86.2	0.12
<b>Per capita household income (MW) *</b>								
< 0.25	217	(77.5)	79.2		121	(57.4)	90.8	
0.25 – 0.49	39	(13.9)	81.2		57	(27.0)	92.3	
≥ 0.50	24	(8.6)	80.3	0.98	33	(15.6)	92.7	0.66
<b>Maternal level of education (years)**</b>								
0 - 4	162	(58.7)	71.7		106	(50.0)	64.6	
5 - 8	75	(27.2)	94.8		66	(31.1)	99.1	
≥ 9	39	(14.1)	85.0	0.12	40	(18.9)	118.9	0.006
<b>Area of residence</b>								
Urban	146	(52.1)	92.9		137	(61.2)	97.7	
Rural	134	(47.9)	70.5	0.08	87	(38.8)	78.2	0.23
<b>Number of individuals/room</b>								
≤ 1	51	(18.2)	82.3		53	(23.7)	95.7	
2 – 3	163	(58.2)	81.6		126	(56.2)	91.7	
≥ 4	66	(23.6)	72.5	0.45	45	(20.1)	84.9	0.60
<b>Water supply</b>								
General network	111	(39.6)	92.4		41	(18.3)	65.4	
Others	169	(60.4)	70.0	0.02	183	(81.7)	93.0	0.58
<b>Sewage system</b>								
General network	64	(22.9)	96.5		64	(28.6)	96.8	
Covered septic tank	81	(28.9)	76.6		67	(29.9)	113.0	
Others	135	(48.2)	73.9	0.34	93	(41.5)	68.2	0.02
<b>Garbage collection</b>								
Collected	86	(30.7)	105.7		114	(50.9)	99.4	
Others	194	(69.3)	69.5	0.002	110	(49.1)	79.1	0.15
<b>Color TV</b>								
Yes	131	(46.8)	85.0		110	(49.1)	88.9	
No	149	(53.2)	74.7	0.84	114	(50.9)	92.5	0.67
<b>Fridge</b>								
Yes	134	(47.9)	84.7		80	(35.7)	97.4	
No	146	(52.1)	76.1	0.58	144	(64.3)	87.7	0.29
<b>Stove</b>								
Yes	187	(66.8)	91.0		170	(75.9)	86.2	
No	93	(33.2)	65.5	0.05	54	(24.1)	98.8	0.15
<b>Satellite dish</b>								
Yes	95	(33.9)	79.5		63	(28.1)	90.1	
No	185	(66.1)	79.5	0.82	161	(71.9)	91.5	0.54

\* São João do Tigre: 13 cases without information; Minimum wage (MW) = R\$ 300.00. \*\* Gameleira: 4 cases without information; São João do Tigre: 12 cases without information.

\* São João do Tigre: 13 casos sem informação; Salário Mínimo (SM) = R\$ 300,00. \*\* Gameleira: 4 casos sem informação; São João do Tigre: 12 casos sem informação.

**Table 2** - Median duration of survival time of exclusive /predominant breastfeeding in children under two years according to maternal factors, health care and child Gameleira (PE) and São João do Tigre (PB), 2005.

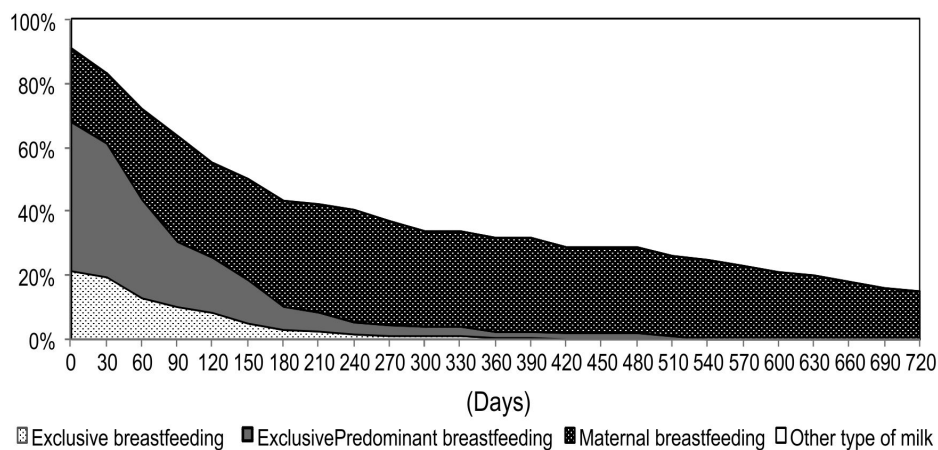
**Tabela 2** - Duração mediana do tempo de sobrevivência do aleitamento materno exclusivo/predominante em menores de dois anos segundo fatores maternos, da assistência à saúde e da criação em Gameleira (PE) e São João do Tigre (PB), 2005.

Variables	Gameleira (N = 280)				São João do Tigre (N = 224)			
	N	(%)	Median (days)	P	n	(%)	Median (days)	P
<b>Maternal age (years)*</b>								
≤ 19	62	(22.2)	80.3		33	(14.9)	92.3	
20 – 29	166	(59.5)	84.5		115	(51.8)	99.1	
≥ 30	51	(18.3)	66.1	0.06	74	(33.3)	63.3	0.13
<b>Maternal BMI (kg/m2)**</b>								
< 18.5	14	(5.2)	75.0		10	(4.7)	105.0	
18.5 – 24.9	149	(55.8)	79.3		120	(56.1)	88.7	
25.0 – 29.9	73	(27.3)	76.5		61	(28.5)	103.7	
≥ 30.0	31	(11.6)	78.0	0.96	23	(10.7)	28.7	0.16
<b>Prenatal care</b>								
Yes	252	(90.0)	82.1		217	(96.9)	92.0	
No	28	(10.0)	51.7	0.03	07	(3.1)	60.0	0.51
<b>Number of consultation during PN***</b>								
< 6	122	(48.4)	79.0		79	(36.4)	58.3	
≥ 6	130	(51.6)	87.2	0.19	138	(63.6)	103.4	0.006
<b>Beginning of prenatal care***</b>								
1st trimester	172	(68.3)	88.5		155	(71.5)	98.9	
2nd trimester	71	(28.2)	72.4		60	(27.6)	74.4	
3rd trimester	09	(3.5)	36.7	0.13	02	(0.9)	0.0	0.02
<b>Guidance on feeding during PN***</b>								
Yes	196	(77.8)	87.8		149	(68.7)	92.4	
No	56	(22.2)	61.6	0.02	68	(31.3)	91.1	0.80
<b>Guidance on MB during PN***</b>								
Yes	213	(84.5)	88.6		171	(78.8)	93.2	
No	39	(15.5)	27.4	<0.001	46	(21.2)	86.4	0.96
<b>Type of delivery</b>								
Vaginal birth	230	(82.1)	81.1		156	(69.6)	83.7	
Cesarean section	50	(17.9)	72.8	0.36	68	(30.4)	102.7	0.24
<b>Child sex</b>								
Female	139	(49.6)	88.8		92	(41.1)	100.0	
Male	141	(50.4)	68.2	0.04	132	(58.9)	80.2	0.29
<b>Birth weight (g)****</b>								
≤ 2,999	55	(20.2)	79.8		46	(20.5)	51.1	
≥ 3,000	217	(79.8)	75.7	0.61	178	(79.5)	93.1	0.20
<b>Previous hospitalization</b>								
Yes	45	(16.1)	54.5		23	(10.3)	37.5	
No	235	(83.9)	83.4	0.11	201	(89.7)	92.7	0.11
<b>Visit from the CHW</b>								
Yes	243	(86.8)	79.3		182	(81.3)	91.1	
No	37	(13.2)	81.8	0.79	42	(18.7)	90.1	0.29

\* Gameleira: one case without information; São João do Tigre: two cases without information; \*\* Gameleira: 13 cases without information; São João do Tigre: 10 cases without information; \*\*\* Gameleira: 28 mothers did not have prenatal care; São João do Tigre: seven mothers did not have prenatal care; \*\*\*\* Gameleira: 8 cases without information. BMI: body mass index; PN: Prenatal care; MB: Maternal breastfeeding; CHW: community health worker.

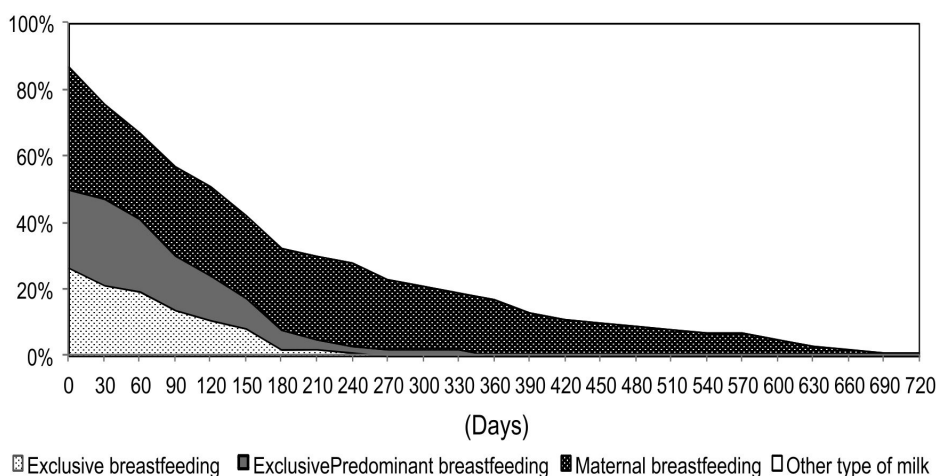
\* Gameleira: 1 caso sem informação; São João do Tigre: 2 casos sem informação; \*\* Gameleira: 13 casos sem informação; São João do Tigre: 10 casos sem informação; \*\*\* Gameleira: 28 mães não realizaram o pré-natal; São João do Tigre: 7 mães não realizaram o pré-natal; \*\*\*\* Gameleira: 8 casos sem informação. IMC: Índice de Massa Corpórea; PN: Pré-natal; AM: Aleitamento Materno; ACS: Agente Comunitário de Saúde.





**Figure 1** - Breastfeeding patterns in children under two years of age. Gameleira, 2005.

**Figura 1** - Padrões de aleitamento em crianças menores de dois anos de idade. Gameleira (PE), 2005.



**Figure 2** - Breastfeeding patterns in children under two years of age. São João do Tigre, 2005.

**Figura 2** - Padrões de aleitamento em crianças menores de dois anos de idade. São João do Tigre (PB), 2005.

exclusive/predominant breastfeeding, Table 1 shows that mothers with higher median survival times were those with better socio-economic conditions, determined by level of education, basic sanitation and ownership of household goods in both cities.

Table 2 shows that adolescent and young adult mothers (aged between 20 and 29 years) had a higher median survival time in both cities. Prenatal care was very important for breastfeeding duration in these two cities, with a longer duration among mothers who had prenatal care (Gameleira) or those who had six or more

consultations and began prenatal care earlier (São João do Tigre). Guidance on maternal breastfeeding and child feeding during prenatal care was associated with a longer duration of exclusive/predominant breastfeeding in Gameleira. The occurrence of previous hospitalization and the routine visit of community health workers were not significantly associated with exclusive/predominant breastfeeding duration in both cities, although a longer duration was found in children who had not been hospitalized in the 12 months prior to interview.

## Discussion

The results of the present study were obtained from a sample of individuals with poor socioeconomic conditions, living in two cities with two of the lowest human development indices in the Northeastern region of Brazil and a high number of families experiencing food insecurity conditions. The analysis of breastfeeding duration was performed with the survival analysis technique, which has the advantage of enabling a longitudinal estimate to be calculated from cross-sectional data. However, although this technique has been widely used, data must be analyzed with caution due to bias inherent in cross-sectional studies, especially those dealing with maternal breastfeeding, as they are almost always performed with recall information, which can lead to participants' memory errors. Nonetheless, the age group analyzed in the present study was children under two years of age, which tends to minimize maternal recall bias.

The median survival time of exclusive breastfeeding was lower than one month in Gameleira and São João do Tigre, which is even lower than those found in the Northeastern region, which shows the worst estimate of exclusive breastfeeding duration among Brazilian regions, with a median of 35 days according to the last survey of prevalence of maternal breastfeeding conducted in Brazilian capitals and Federal District, in 2008<sup>14</sup>. However, a cross-sectional study derived from a prospective cohort study conducted in the Coastal Plain Area of the state of Pernambuco in 1998, including 364 children from four larger rural cities (Palmares, Catende, Joaquim Nabuco and Água Preta), found that the median of exclusive breastfeeding was zero days, where 72% of children received water and tea on the first day of life and 80%, in the first week of life. Prevalence of exclusive breastfeeding at six months was only 0.6%<sup>15</sup>. These results, as those observed in the present study, are well below what was expected, as 100% of children in this age group should be exclusively breast-fed.

The median survival times of exclusive/predominant breastfeeding and that of maternal breastfeeding found in the present study are not satisfactory either. When the results of this study are compared with those obtained in the city of João Pessoa, the median of exclusive/predominant breastfeeding (53 days) was found to be lower than those in Gameleira and São João do Tigre, although maternal breastfeeding duration was slightly higher (195 days). In the same survey, the city of Florianópolis obtained substantially higher medians: 94 days for exclusive/predominant breastfeeding and 238 days for maternal breastfeeding<sup>16</sup>. Venâncio et al. analyzed the breastfeeding situation in 84 cities of the state of São Paulo and found that only two cities had a prevalence of exclusive/predominant breastfeeding lower than 20% among children younger than four months<sup>17</sup>. These results reveal that the maternal breastfeeding situation is better in the Southern and Southeastern regions of Brazil, probably because of the higher level of education and income of mothers living in these regions.

Early introduction of water and tea (predominant breastfeeding) is a frequent practice, even when populations are instructed not to use such liquids. In Brazil, according to popular culture, teas have soothing and laxative properties and water should be offered to babies to quench their thirst, especially on warmer days. However, this association reduces the protection of maternal milk against infectious processes and maternal breastfeeding duration, in addition to its being an unnecessary practice when children are exclusively breast-fed<sup>18</sup>.

Considering maternal breastfeeding as a whole, the state of Pernambuco obtained a median of 183 days in 2006, according to the last Nutrition and Health State Survey<sup>19</sup>. In São José do Rio Preto, state of São Paulo, the median of maternal breastfeeding was 206 days<sup>20</sup>, while in Itaúna, state of Minas Gerais, it was 237 days<sup>21</sup>. In the state of Paraíba, a cross-sectional study conducted in 70 cities found that 75% of children under six months of age were being breast-fed<sup>22</sup>. In Feira de



Santana, state of Bahia, Northeastern Brazil, the prevalence of maternal breastfeeding among children under one year was 69%<sup>3</sup>. These percentages and median durations show that the cities of Gameleira and São João do Tigre have the worst maternal breastfeeding situations, when compared to the cities mentioned above.

When the factors associated with exclusive/predominant breastfeeding duration in the present study are analyzed with survival probability curves, maternal level of education, per capita household income and food (in)security were found to not be significantly associated with this practice in the city of Gameleira, whereas only maternal level of education had a significant association with it in São João do Tigre. A study conducted in this same state by Bittencourt et al. found that a higher level of education and income were protective factors for exclusive breastfeeding<sup>4</sup>.

By analyzing the risk factors for weaning in the state of São Paulo, Venâncio et al. observed that, the higher the level of education, the greater the chance of a child being exclusively breast-fed. Additionally, women with up to four years of education are 2.2 times more likely to introduce other foods in their children's diet in the first months of life, when compared to those with 13 years of education or more<sup>17</sup>. Other studies also found this association<sup>5,23</sup> and Kummer et al. concluded that women with a higher level of education have increasingly valued exclusive breastfeeding and that this trend did not reach poorer socioeconomic strata<sup>24</sup>.

Environmental conditions, such as available basic sanitation, water supply and garbage collection, reflect the socioeconomic conditions of families and are used as indicators of this situation. In the present study, children who lived in homes with better water supply, garbage collection and sewage system conditions had a longer exclusive/predominant breastfeeding duration. Escobar et al. assessed the socioeconomic and cultural conditions of children followed at the Clinical Hospital in the city of São Paulo and observed that mothers who

lived in homes with a sewage system had a longer breastfeeding duration<sup>2</sup>.

With regard to geographical region, there was a higher predominance of exclusive/predominant breastfeeding among mothers living in urban areas. Probably, access to and a higher number of qualified health services available, in addition to the strategies adopted by public maternal breastfeeding promotion policies in urban areas, could explain this better situation, also observed in different studies such as those by Vasconcelos et al. and Figueiredo et al.<sup>5,20</sup>.

The effects of maternal nutritional status on breastfeeding duration are inconsistent with the literature; however, Gigante et al. investigated the effects of maternal nutritional status on the prevalence of breastfeeding in children of the city of Pelotas, Southern Brazil, and found that women who weighed 49 kg or more when they began their pregnancy had higher maternal breastfeeding indices, when compared to those with a lower pre-gestational weight<sup>25</sup>. In the present study, maternal body mass index was not associated with exclusive/predominant breastfeeding duration.

Another frequently studied factor is the intervention of health professionals during prenatal care, who positively influence breastfeeding. Several studies have observed this association<sup>4-6,21</sup> and the present study confirmed that prenatal care, beginning this care in the first gestational trimester, having six or more consultations and receiving guidance on maternal breastfeeding and child feeding are protective factors for longer breastfeeding duration. The routine visit of community health workers did not influence breastfeeding duration in any of the two cities, although certain studies have shown the importance of intervention by these professionals, who are suitably qualified to improve maternal breastfeeding indices<sup>26,27</sup>.

Type of delivery and child birth weight were not significantly associated with maternal breastfeeding in the present study. The influence of type of delivery in breastfeeding duration has been studied by several authors<sup>4,20,28,29</sup> and the results found

are controversial. However, certain studies verified a higher frequency of breastfeeding among babies born by vaginal birth<sup>6,20,30</sup>, suggesting that Cesarean section may be a risk factor for weaning. One of the possible explanations is that C-sections results in longer post-partum recovery, increasing the mother's physical discomfort and use of anesthetics and analgesics, extending hospitalization time, and hindering shared accommodation. This, in turn, can delay the first contact between mother and child and promote the early introduction of other foods in the child's diet. As a risk factor for early weaning, Cesarean sections must be taken into consideration in policies that promote maternal breastfeeding, due to their high frequency in Brazil. Consequently, it is necessary to develop educational activities about maternal breastfeeding in shared rooms, taking advantage of the time mothers spend while hospitalized, so as to provide greater support and clarification about breastfeeding.

With regard to birth weight, the literature has shown that newborns weighing less than 2,500g were breast-fed for a shorter time, when compared to the remaining ones<sup>3,21,28,31</sup>. This fact can be explained by the lower weight babies' greater difficulty in being breast-fed and by the belief held by certain health professionals that faster weight gain would be of great benefit for these babies. However, this would mean using baby formulas, flours, cow milk and sugar<sup>21</sup>. It has been observed that this behavior can become a risk factor for obesity in adolescence and subsequent onset of the metabolic syndrome<sup>32</sup>.

It should be emphasized that the duration of exclusive/predominant breastfeeding was higher in female children, in both cities (statistically significant in Gameleira exclusively). This result was not expected, based on the cultural patterns

of the Brazilian population that do not benefit one sex over the other in terms of child feeding.

There was a longer breastfeeding duration among children who had not been hospitalized in the 12 months prior to interview, when compared to those who had been. This finding reflects the protective role of maternal breastfeeding, reducing infectious processes and, consequently, leading to a lower occurrence of hospitalizations.

The diagnosis of the breastfeeding situation of these two cities showed that weaning has been occurring too early and that maternal breastfeeding indices are well below the values recommended by national and international consensus groups, which could contribute to an increase in morbidity of children living in these areas, especially because they are populations with poor socioeconomic and environmental conditions, where the risk of death from infectious diseases in children who were not breast-fed is higher.

Thus, these findings should serve as a warning for the need to restructure maternal breastfeeding support strategies in areas with similar socioeconomic conditions, taking into consideration the factors that influence breastfeeding when such actions are performed.

### Acknowledgements

Authors would like to thank the *Conselho Nacional de Desenvolvimento Científico e Tecnológico* (CNPq – National Council for Scientific and Technological Development) for the financial support, which enabled the development of these research projects, and for the research productivity scholarships granted to Marília Lima and Pedro Lira; the participating families; team of field work interviewers; and project coordinators.

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Received: 13/05/11  
Final version: 02/09/11  
Approved: 09/09/11